



# Xgig® FCoE Testing Solutions

FCoE expands Fibre Channel into the Ethernet environment, combining two leading technologies—FC and Ethernet—to provide more options to end users for SAN connectivity and networking. It provides a low cost path for I/O consolidation with no sacrifice of performance and latency.

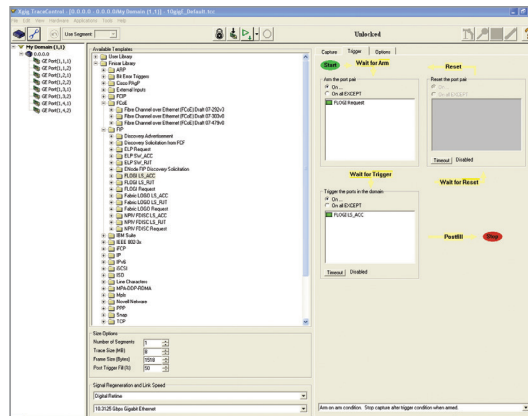
*We accelerate product time-to-market, so you can outpace your competition and gain market leadership*

The progression of FCoE has created the need for new protocol tools for protocol verification and compliance testing. Protocol analyzer is required for trace capture and debugging; Error injection is required for data manipulation and variations; Layer-2 FCoE traffic generation is required for the performance and stress tests of FCoE switches; and I/O tester is required for component performance verifications.

The Viavi Solutions leading Xgig® protocol test platform is the industry unique solution capable of multi- protocols, multi- functions, multi- time-sync ports, and multi- data rates. Xgig provides the users with a full suite of protocol test tools on a single set of hardware. On the same platform, protocols such as Fibre Channel, Ethernet, SAS/SATA, FCIP, iSCSI, TCP/IP and FICON can be tested concurrently. Moreover, by applying various licenses on the same hardware, the Xgig platform can perform different functions for protocol analyzer, protocol error injector, protocol generator, and bit error tester.



PerformanceMonitor: Real-time performance monitor



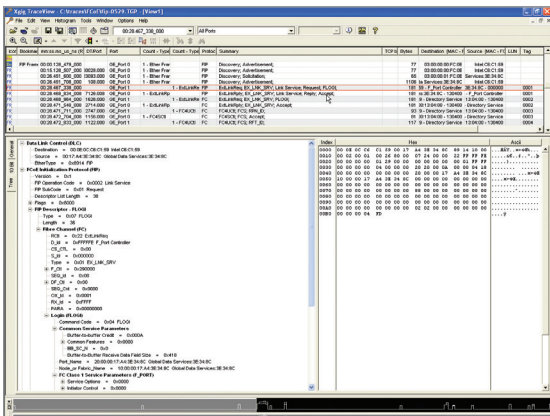
TraceControl: Sets up triggering and filtering, takes the trace

## Feature Highlights for Xgig FCoE Tests

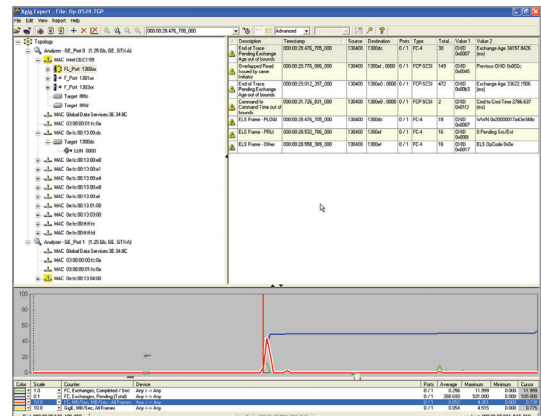
- **Hardware based protocol analyzer.** FCoE is built based on lossless Ethernet, while the reception buffer is controlled by Pause-based flow control (IEEE 802.3–2005 standard) or Priority-based flow control (IEEE 802.1Qbb). Xgig, the hardware based protocol analyzer tool, guarantees 100% data capture, giving a complete and accurate protocol analysis.
- **Real-time multiple CRCs monitoring.** An FCoE frame encapsulates an entire FC frame, including the CRC, thus it carries two CRCs. Xgig monitors both of them in real-time in order to catch erroneous frames with appropriate trigger setup.
- **Time correlation tests between FC and Ethernet.** When FCoE is deployed in conjunction with a native Fibre Channel fabric, an FCoE switch performs the FCoE mapping function between Ethernet and Fibre Channel. Xgig's capability to correlate the time when an FCoE frame is detected with the time when an FC frame is seen allows crucial monitoring capability of the FCoE mapping function.
- **Extensions of Ethernet Supporting.** The new additions to the conventional Ethernet are critical for enabling I/O consolidation with FCoE infrastructure. Xgig supports and debugs issues for all three major enhancements currently under development: IEEE 802.1Qau-Congestion Notification, IEEE802.1Qaz-Enhanced Transmission Selection, and IEEE802.1Qbb-Priority Based Flow Control.
- **Industry leading Expert support on FCoE.** Xgig Expert suite is the largest collection of practical protocol debugging cases in the industry. Covering more than 680 metrics, Xgig extends the Expert system to help design new enhanced and converged network architecture.

## Function Highlights of Xgig FCoE Tests

- **Protocol Analyzer**—Capture and analyze the FCoE traces. The software suite includes four key functions:
  - **TraceControl** for setting up the trigger conditions for capturing traces.
  - **PerformanceMonitor** for providing real-time data traffic statistics and reporting errors.
  - **TraceView** for decoding the traces captured by Xgig or other trace capture tools and providing a fast search/filter/extract utility to support protocol debugging.
  - **Expert** for providing automatic trace analysis (Ethernet, 10GE, Fibre Channel and FCoE) utilizing 680+ built-in errors, warnings, and information metrics. It also summarizes the performance and behavior of the devices under test with a rich set of protocol related statistics.
- **Error Injection (Jammer)**—Modify, delete or add FCoE frames, MAC layer, and FC/FCoE headers. Jammer function is also capable of changing the contents in the frame allowing the users to manipulate the traffic (i.e. change the priority tag in priority-based flow control, create LOS to break the link, re-direct the traffic to different destinations by changing the MAC address, etc.)
- **Traffic Generation**—Generate FCoE traffic at full-line rate with options for payload size, payload patterns, topologies, (i.e. discovering multiple Fibre Channel and FCoE ports of one-to-one links and/or meshed links) and NPIV configurations; provide the traffic statistics data including latencies, throughputs, frame losses and frame errors; and trigger the external analyzer to capture the erroneous traces for further debugging.



TraceView: Displays, searches, filters, and exports traces



Expert: Automatically finds unexpected behaviors



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